A NEW SPECIES OF DEEPWATER CATSHARK, *APRISTURUS ALBISOMA* N. SP. FROM NEW CALEDONIA (CHONDRICHTHYES: CARCHARHINIFORMES: SCYLIORHINIDAE)

by

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ABSTRACT. - *Apristurus albisoma* is described from New Caledonia at depths ranging from 935 to 1,564 m. The description is based on 21 type specimens, which include immature and mature males and females, ranging from 328 to 596 mm in total length. This new species is distinguishable from other species of the genus by the following characters: small eyes and wide interorbital region; the latter being 2.7-3.6 times eye diameter; first dorsal fin originating above middle of pelvic-fin base; second dorsal-fin axil before anal-fin axil; upper labial furrows equal to, or shorter than lower furrows; overlapping tricuspid dermal denticles; 6-10 spiral valves; continuous supraorbital sensory canal; body whitish.

RÉSUMÉ. - Une nouvelle espèce de roussette de profondeur, *Apristurus albisoma* n. sp., de Nouvelle-Calédonie (Chondrichthyes: Carcharhiniformes: Scyliorhinidae).

Une nouvelle espèce de roussette de profondeur, *Apristurus albisoma*, est décrite de Nouvelle-Calédonie, à partir de 21 spécimens comprenant des juvéniles, des femelles et des mâles adultes de 328-596 mm TL, récoltés entre 935 et 1 564 m de profondeur. Elle se différencie de ses congénères par: des yeux petits et une région interorbitaire large, représentant 2,7-3,6 fois le diamètre de l'œil; l'origine de la première nageoire dorsale est située au-dessus du milieu de la base des nageoires pelviennes; l'origine de la seconde nageoire dorsale est située en avant de l'aisselle de la nageoire anale; les sillons labiaux supérieurs sont égaux ou plus courts que les inférieurs; les denticules cutanés sont tricuspides et imbriqués; la valvule spirale compte 6-10 tours; le canal sensoriel supraorbitaire est continu; le corps est blanchâtre.

Key-words. - Scyliorhinidae, *Apristurus albisoma*, ISE, New Caledonia, New species.

The genus *Apristurus* Garman, 1913 is a large group of deep-water catsharks, inhabiting continental slopes and submarine elevations mainly below 500 m. The taxonomy of this genus has been studied mainly by Springer (1966, 1979), Nakaya (1975), Cadenat and Blache (1981), and Compagno (1984). Since 1984, many additional species have been described (Zhu *et al.*, 1981, 1986; Deng *et al.*, 1983, 1985, 1988; Dolganov, 1985; Meng *et al.*,1985). As a result of these studies, the number of nominal species reached 37 by 1988. However, none of the species has been critically discussed with relation to synonymy with other species. Compagno (1988) attempted to divide the species of the genus into species groups, and also mentioned the presence of some unde-

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scribed species. Paulin *et al.* (1989) listed five species from New Zealand, but they did not name them. Nakaya (1991) reviewed the long-snouted species of *Apristurus* and synonymized five Chinese species with *A. herklotsi.* Last and Stevens (1994) recognised several species from Australia, but they were unable to identify seven of their eight species, treating them as *Apristurus* spp. Séret (1997) recorded seven species from New Caledonia, some similar to the Australian unnamed species of Last and Stevens (1994), and some new. Nakaya and Stehmann (1998) described *A. aphyodes* from the eastern North Atlantic, and Nakaya and Sato (1998) synonymized *A. maderensis* with *A. laurussonii* from the same waters. Further, Nakaya and Sato (1999) reviewed all the species of the genus, and divided them into three species groups.

To summarise present taxonomic status of the genus, 32 species are currently recognised as distinct and they are divided into three species groups. However, their taxonomy is confusing, since there are still a number of taxonomically ambiguous species and undescribed species.

As mentioned above, unnamed and undescribed species are known to be present in the waters of New Zealand, Australia and New Caledonia. Here we describe one of them from New Caledonia as a new species.

MATERIALS

In addition to the type specimens of the present new species, the following comparative materials were investigated:

A. aphyodes Nakaya & Stehmann, 1998

Holotype. - ISH 71-1981, 538.0 mm TL, male, Lousy Bank, Eastern North Atlantic.

Paratypes. - 17 specimens: ISH 807-1974, ISH 807-1974, ISH 24-1981, ISH 36-1981, ISH 49-1981, ISH 84-1981, ISH 124-1981, ISH 184-1983, ISH 187-1983, HUMZ 152330, USNM 347837, ZIN N51551, BMNH 1998.1.22.1, 209.2-540.0 mm TL, 8 males and 9 females, eastern North Atlantic.

A. fedorovi Dolganov, 1985

28 specimens: HUMZ 40074, HUMZ 69163, HUMZ 72690, HUMZ 72716, HUMZ 72871, HUMZ 73037, HUMZ 74628, HUMZ 78038, HUMZ 78052, HUMZ 78064, HUMZ 78071, HUMZ 78100, HUMZ 78101, HUMZ 78105, HUMZ 78140, HUMZ 78174, HUMZ 78195, HUMZ 78196, HUMZ 78260, HUMZ 78276, HUMZ 78281, HUMZ 78316, HUMZ 78318, HUMZ 78333, HUMZ 78334, HUMZ 78374, HUMZ 78454, HUMZ 85087, 320.0-683.0 mm TL, 15 males and 13 females, northern Japanese waters.

A. kampae Taylor, 1972

Holotype. - SIO 70-248-5, 348.0 mm TL, female, Gulf of California.

31 other specimens: CAS 38287, CAS 57935, HUMZ 105601, HUMZ 105603, HUMZ 105604, HUMZ 105608, HUMZ 110317, HUMZ 110318, HUMZ 110319, HUMZ 110320, HUMZ 110321, HUMZ 110322, HUMZ 110323, HUMZ 110324, HUMZ 110325, HUMZ 110326, HUMZ 110330, HUMZ 110331, HUMZ 110332, HUMZ 110333, HUMZ 110334, HUMZ 110335, HUMZ 110336, HUMZ 110337, LACM 37499-1, SIO 70-299, SIO 71-190, SIO 88-100, SIO 88-98, SIO 99-99, 198.0-584.0 mm TL, 16 males and 15 females, Californian waters and Galapagos Islands.

A. *manis* (Springer, 1979)

Holotype. - MCZ 38299, 390.0 mm TL, female, waters off Massachusetts.

Paratypes. - 4 specimens: MCZ 37416 (2 spms), MCZ 37512, MCZ 37535, 227.0-255.0 mm TL, 3 males and 1 female, waters off Massachusetts.

11 other specimens: ARC 8601097, ARC 8602997, ISH 154-1974a, ISH 154-1974b, ISH 3412-1979, ISH 3449-1979, ISH 3712-1979, ISH 3713-1979 (2 spms), MCZ 37407, 1 specimen of P.P. Shirshov Inst. (uncatalogued), 183.2-852.1 mm TL, 4 males and 7 females, North Atlantic.

A. *microps* (Gilchrist, 1922)

Identification of this species follows Compagno, 1984.

MCZ 58434, ISH 943-1973, ISH 944-1973, ISH 698-1974 (2 spms), ISH 697-1974, ISH 49-1981, ISH 945-1973, ISH 195-1967 (2 spms), 259.3-730.0 mm TL, 4 males and 7 females, North Atlantic and South African waters.

A. *pinguis* Deng, Xiong & Zhan, 1983

Holotype. - ECSFRI (East China Sea Fisheries Research Institute, Shanghai) SH80D-312, 558.0 mm TL, male, East China Sea.

8 other specimens: HUMZ 145143, HUMZ 145144, HUMZ 145145, HUMZ 145146, HUMZ 145147, HUMZ 145148, HUMZ 145149, HUMZ 145150, 278.0 - 548.0 mm TL, 5 males and 3 females, East China Sea.

A. *profundorum* (Goode & Bean, 1895)

Holotype. - USNM 35646, 510.0 mm TL, male, off Delaware Bay.

A. *riveri* Bigelow & Schroeder, 1944

Holotype. - MCZ 36092, 413.0 mm TL, female, waters off north of Cuba.

16 other specimens: USNM 199395, USNM 199396, USNM 201760 (2 spms), USNM 221526 (2 spms), USNM 221528, USNM 221530, USNM 221531, USNM 221533 (2 spms), USNM 221535, USNM 221536 (2 spms),USNM 221760 (2 spms), 298.0-470 mm TL, 7 males and 9 females, Caribbean and Gulf of Mexico.

A. *spongiceps* (Gilbert, 1905)

Holotype. - USNM 51590,514.0 mm TL, female, Hawaii.

A. *stenseni* (Springer, 1979)

Holotype. - ZMUC-P 6146, 185.0 mm TL, male, eastern Pacific in Gulf of Panama.

Paratypes. - 11 specimens: ZMUC-P 6147, ZMUC-P 6148, ZMUC-P 6159, ZMUC-P 6162, ZMUC-P 6164, ZMUC-P 6166, ZMUC-P 6173, ZMUC-P 6182, ZMUC-P 6189, HUMZ 138785, HUMZ 138786, 118.0-228.0 mm TL, 5 males, 5 females and 1 specimen of unknown sex, Gulf of Panama.

METHODS

Morphometric measurements follow Bigelow and Schroeder (1948) and Nakaya (1991), vertebral terminology and counts are those of Springer and Garrick (1964), and clasper terminology follows Compagno (1988). Institutional acronyms are those of Leviton *et al.* (1985).

Table I. - Proportional measurements (% of total length) and counts of *Apristurus albisoma* n. sp.

	Holotype	**Paratypes**
Total length	573.0 mm	328.0 - 596.0 mm
Sex (n)	male	males (13), females (7)
Snout tip to:		
anterior nostril	4.1	3.7-5.4
posterior nostril	5.9	5.7-7.9
mouth	7.5	7.1-9.9
eye	9.5	9.2-12.2
1st gill opening	18.5	18.2-20.9
1st dorsal origin	53.2	48.5-54.3
2nd dorsal origin	66.3	61.3-67.9
anal origin	60.2	56.6-63.3
lower caudal origin	72.9	68.1-74.2
pelvic origin	45.9	44.4-50.4
pectoral origin	23.0	22.5-25.5
Diameter of:		
eye	2.3	2.4-3.1
nostril	2.9	2.6-3.8
Interorbital width	8.3	7.8-10.1
Internarial width	4.2	3.8-5.0
Labial furrow:		
upper	2.8	2.1-3.3
lower	2.9	2.8-4.0
Interspace between:		
1st and 2nd dorsal fins	8.4	6.0-8.9
nostril and mouth	1.8	1.6-2.7
Distance between:		
origins of paired fins	23.7	20.0-24.7
axils of two dorsal fins	14.5	11.9-14.8
First dorsal fin:		
vertical height	2.6	2.1-3.5
base length	5.9	6.0-7.7
Second dorsal fin:		
vertical height	3.5	2.9-3.6
base length	6.4	4.4-7.2
Anal fin:		
vertical height	6.1	4.6-6.5
base length	13.7	11.1-13.4
Caudal fin:		
peduncle height	4.4	4.1-4.8
lower origin to tip	27.0	26.1-32.3
Tooth rows:		
upper	60	56-71
lower	61	54-70
Vertebrae:		
monospondylous	34	34-36
precaudal diplospondylous	28	25-30
Spiral valves	8	6-10

APRISTURUS ALBISOMA N. SP.

(Table I, Figs 1-5)

Apristurus sp. n° 6 « albinos »: Séret, *in* Grandperrin *et al.*, 1997: 112 (listed).

Material studied

Holotype. - MNHN 1997-3366, male, 573.0 mm TL, HALIPRO 2, Station BT 41, 14 Nov. 1996, 25°47'77S, 167°11'52E to 25°50'65S, 167°12'47E, 1317-1383 m, R.V. "Tangaroa", bottom trawl, bottom temperature (BTM) 4.1°C.

Paratypes. - 20 specimens: MNHN 1997-3359, male, 595.0 mm TL, MNHN 1997-3361, female, 566.0 mm TL, MNHN 1997-3365, male, 582.0 mm TL, HALIPRO 2, Station BT 41, 14 Nov. 1996, 25°47'77S, 167°11'52E to 25°50'65S, 167°12'47E, 1317-1383 m, BTM 4.1°C; MNHN 1997-3368, male, 540.0 mm TL, MNHN 1997-3369, male, 596.0 mm TL, MNHN 1997-3370, male, 592.0 mm TL, HALIPRO 2, Station BT 42, 15 Nov. 1996, 25°34'29S, 167°25'08E to 25°34'48S, 167°21'74E, 1132-1160 m, BTM 4.6°C; MNHN 1997-3360, female, 548.0 mm TL, MNHN 1997-3372, male, 534.0 mm TL, MNHN 1997-3373, male, 555.0 mm TL, MNHN 1997-3375, female, 550.0 mm TL, HALIPRO 2, Station BT 46, 15 Nov. 1996, 25°41'99S, 167°25'60E to 25°42'98S, 167°22'43E, 1230-1268 m, BTM 4.3°C; MNHN 1967-3376, male, 376.0 mm TL, HALIPRO 2, Station BT 68, 16 Nov. 1996, Mont Trygon, 24°48'20S, 168°17'12E to 24°49'51S, 168°17'81E, 1316-1564 m, BTM 3.9°C; MNHN 1997-3337, male, 398.0 mm TL, MNHN 1997-3350, male, 587.0 mm TL, HALIPRO 2, Station BT 73, 20 Nov. 1996, 24°52'96S, 167°37'41E to 24°51'41S, 167°40'26E, 1043-1102 m, BTM 5°C; MNHN 1997-3379-1, female, 350.0 mm TL, MNHN 1997-3379-2, female, 382.0 mm TL, MNHN 1997-3379-3, female, 328.0 mm TL, HALIPRO 2, Station BT 74, 20 Nov. 1996, 24°44'90S, 167°43'10E to 24°47'49S, 167°41'44E, 1213-1246 m, BTM 4.1°C; MNHN 1997-3358, male, 376.0 mm TL, MNHN 1997-3380, female, 554.0 mm TL, HALIPRO 2, Station BT 85, 23 Nov. 1996, Mont Jumeau Ouest, 23°40'02S, 168°03'15E to 23°40'04S, 168°05'33E, 935-1100 m, BTM 5.2°C; MNHN 1997-3382, male, 507.0 mm TL, HALIPRO 2, Station 95, 25 Nov. 1996, 23°56'86S, 162°07'57E to 23°59'80S, 162°08'21E, 1224-1233 m, BT 4.2°C; MNHN 1997-3383, male, 547.0 mm TL, HALIPRO 2, Station 96, 25 Nov. 1996, 23°56'56S, 161°53'14E to 23°58'96S, 161°55'15E, 1034-1056 m, BTM 4.6°C.

Diagnosis

A species of *Apristurus* with small eyes; wide interorbital region that is 2.7-3.6 times eye diameter; first dorsal fin originating above middle of pelvic-fin base; second dorsal-fin axil located before anal-fin axil; upper labial furrows equal to or shorter than lower furrows; overlapping tricuspid dermal denticles; 6-10 spiral valves; continuous supraorbital sensory canal; body whitish.

Description of the holotype

Proportional measurements and meristic counts are given in table I. Differences for paratypes demonstrating the range of meristic counts and other features are given in parentheses.

Body slender and cylindrical (Fig. 1A). Snout relatively long and flattened; preorbital snout length slightly longer than half of length from snout tip to first gill open-

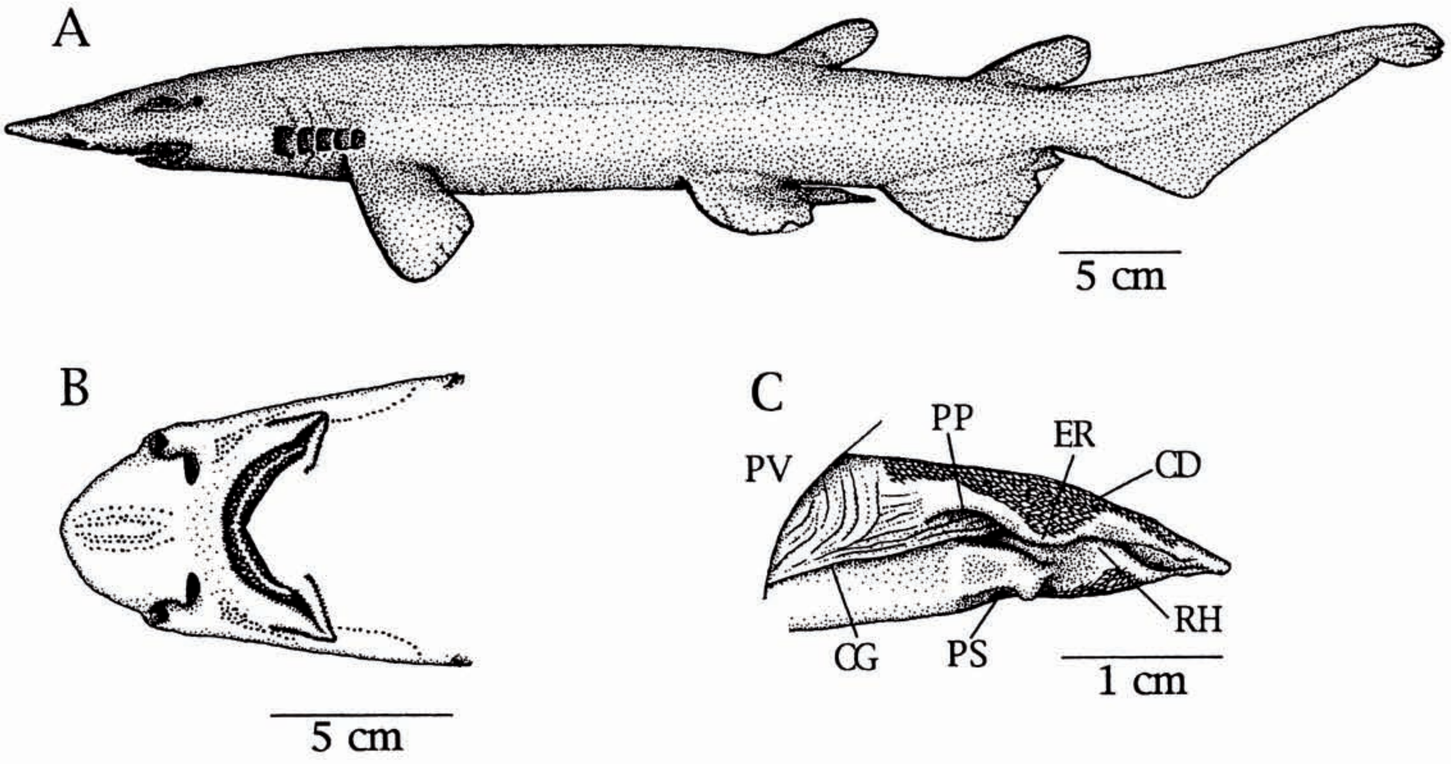

Fig. 1. - *Apristurus albisoma* n. sp. from New Caledonia. **A**: lateral view of the holotype MNHN 1997-3366, male, 573 mm TL. **B**: ventral view of head of the holotype MNHN 1997-3366, male, 573 mm TL. **C**: dorsal view of right clasper in paratype MNHN 1997-3383, male, 547.0 mm TL. CD: clasper denticles; CG: clasper groove; ER: exorhipidion; PP: pseudopera; PS: pseudosiphon; PV: pelvic fin; RH: rhipidion.

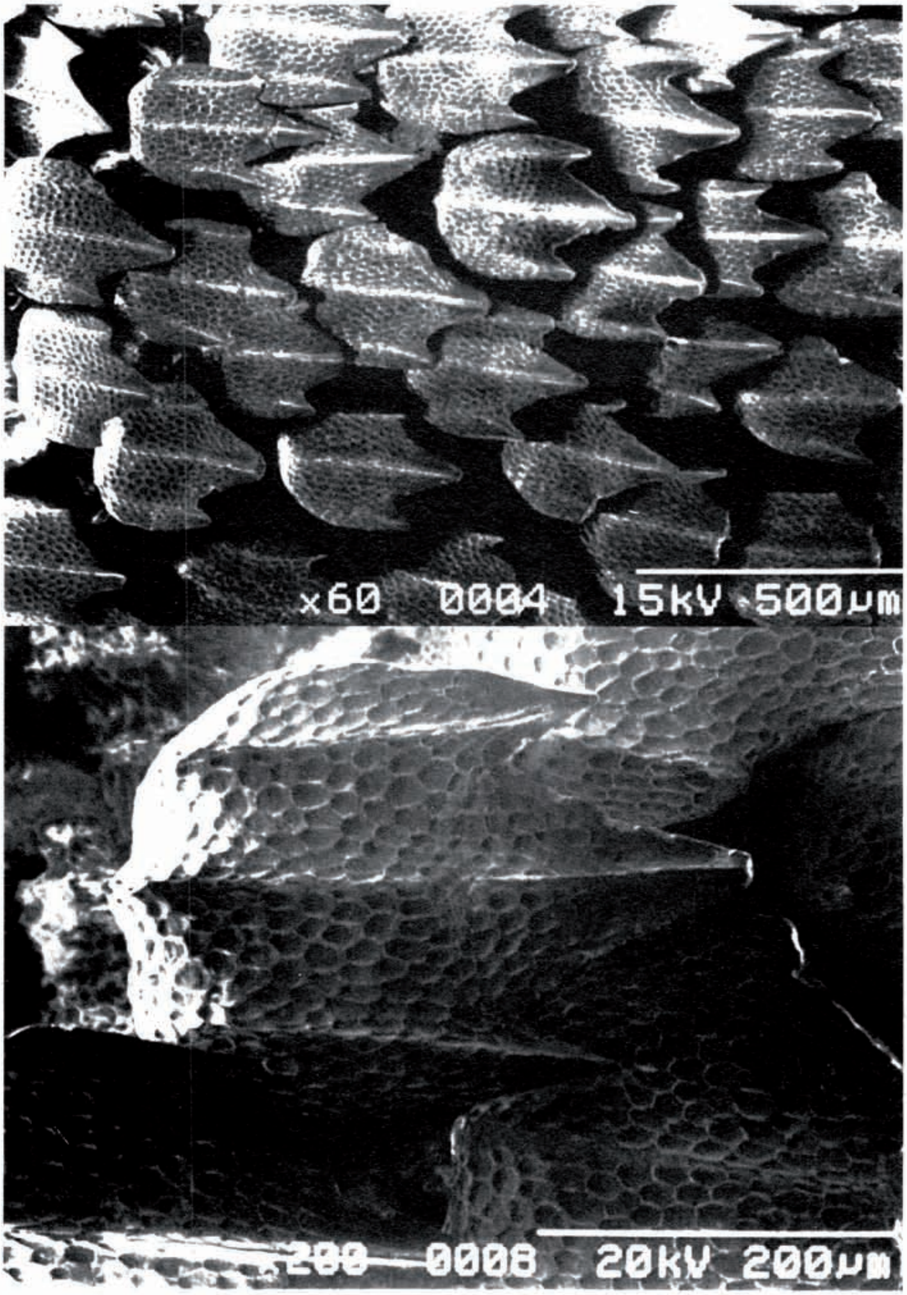

Fig. 2. - Dermal denticles of *Apristurus albisoma* n. sp. from dorso-lateral part of the holotype MNHN 1997-3366, male, 573 mm TL.

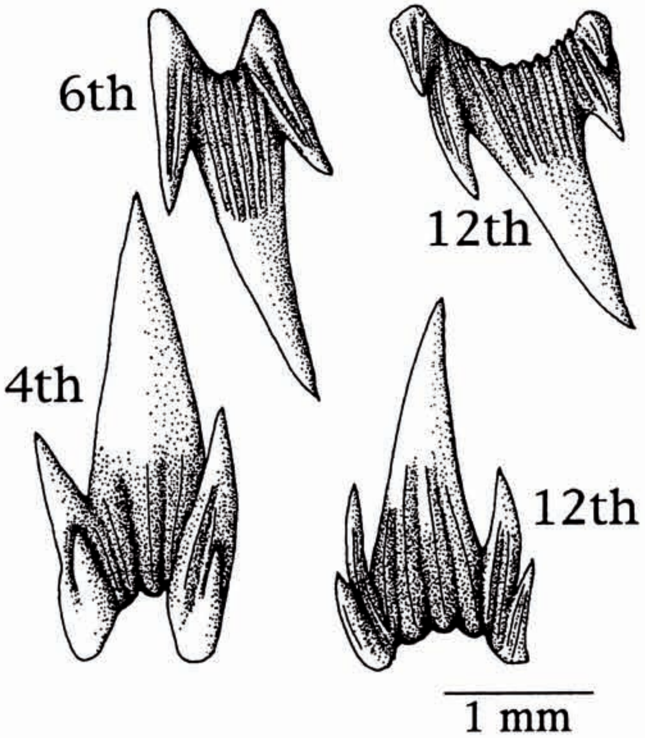

Fig. 3. - Outer views of left upper and lower teeth in *Apristurus albisoma* n. sp., holotype MNHN 1997-3366, male, 573 mm TL. Numbers indicate tooth position from the symphysis.

ing; prenarial snout a little longer than half of preoral snout length, about equal to internarial width, and half of interorbital width; snout bell-shaped, with snout edges protruding at level of anterior nasal aperture; snout tip rather bluntly rounded (Fig. 1B). Supraorbital sensory canal continuous. Nostrils expanding obliquely inward from snout edges; diameter two thirds of internarial width or a little greater than horizontal eye diameter. Posterior corner of nostrils separated from mouth by a distance slightly less than half the internarial width. Numerous pores of Lorenzini's ampullae conspicuous on dorsal and ventral surfaces of snout; those on midline of ventral side arranged in an elliptical field; those on dorsal side arranged in a few rows anteriorly, in about 10 rows posteriorly, forming a slender elliptical patch. Mouth arched, moderate in size, with well developed labial furrows; upper furrows slightly shorter than lower furrows (upper furrows equal to or shorter than lower furrow); upper furrow not reaching to mid-point between mouth corner and posterior margin of nostril. Eye small and oval, with a weak subocular fold; horizontal diameter a little more than half of internarial width, or a little more than one fourth of interorbital width. Spiracle small, placed slightly below level of horizontal axis of eye. Five gill openings small; 5th gill opening smallest, located above pectoral fin base.

Pectoral fins relatively small, narrow, and subquadrangular; when laid back, their tip not reaching anterior one fourth of interspace between bases of paired fins. Pelvic fins moderate in size; their overall length longer than half of interspace between bases of paired fins. Pectoral and pelvic fins widely spaced; distance between origins of pectoral and pelvic fins almost equal to distance from snout tip to pectoral-fin origin; interspace between bases of paired fins longer than length from snout tip to spiracle, but shorter than that to first gill opening. First dorsal fin a little smaller than second dorsal fin; its origin over midpoint of pelvic-fin base; its posterior end of base (axil) above middle of interspace between pelvic and anal fins (a little before anal-fin origin in females); its tip slightly before anal origin (above anal origin in females). Second dorsal fin origin above middle of anal-fin base; its axil before that of anal fin. Anal fin high with a short base and rounded outer margin; its origin a little behind free rear tip of first dorsal fin; its axil behind that of second dorsal fin. Anal and caudal fins separated only by a notch. Caudal fin slender and short; its lower anterior corner only slightly expanded; a distinct subterminal notch present. Caudal peduncle deep; its height almost equal to internarial width; caudal axis nearly straight.

Clasper short and robust, almost reaching to anal-fin origin (Fig. 1C); ventral and lateral sides covered with clasper denticles; clasper hooks or claw absent; pseudosiphon appearing as a rounded hole; cover rhipidion vestigial; pseudopera large and deep; exorhipidion flat and simple in shape without free posterior end.

Dermal denticles on dorsolateral side of body small and overlapping (Fig. 2); their shape tricuspid, with a large medial cusp and much smaller lateral cusps; outer surfaces of denticles rather flat as a whole; medial ridge rather low, and lateral ridges weak. Denticles on dorsal margin of caudal fin closely packed, thick, strongly tricuspid with three high ridges, but not forming distinct caudal crest.

Teeth on upper and lower jaws with a long central cusp and one or two short lateral cusps on each side of central cusp (Fig. 3); those near mouth corners with two lateral cusps (teeth of mature female with one central cusp and two lateral cusps on each side). Tooth rows 29+31/31+30 on upper/lower jaw (28-35+28-36/26-35+27-35).

Number of monospondylous vertebrae 34 (34-36), precaudal diplospondylous vertebrae 28 (25-30). Number of spiral valves 8 (6-10).

Colour in alcohol. - Body and fins uniformly whitish (Fig. 4A). Ventral side of head and body darker than dorsal side. Anterior margins of pectoral, pelvic, dorsal, and anal fins darker. Gill opening area dark. Specimen MNHN 1997-3383, male 547 mm TL, exhibits a pattern of few ocellus-like blotches, irregularly scattered on head and trunk (Fig. 5), which seem to be caused by parasites or some other external effects.

Sexual maturity

Male and female specimens smaller than 382 mm TL are immature, while those larger than 507 mm TL are all mature. Sexual maturity is attained between 40 and 50 cm TL.

Egg capsule

Unknown.

Stomach contents

Penaeid shrimps of the genus *Gennadas* were found in the stomach of some specimens of station BT 41 and a squid beak in that of specimen MNHN 1997-3350 (Station BT 73).

Distribution

Southern waters off New Caledonia, on the slope of the seamounts of the Norfolk Ridge and Lord Howe Ridge between 935 and 1564 m depth.

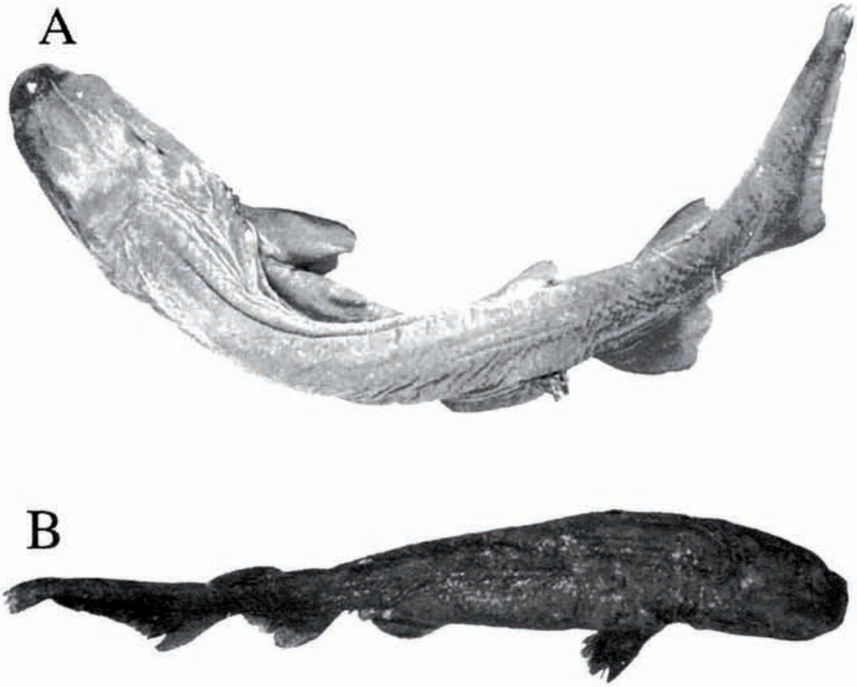

Fig. 4. - *Apristurus albisoma* n. sp. (**A**: holotype MNHN 1997-3366, male, 573 mm TL) and *A. pinguis* (**B**: holotype ECSFRI SH80D-312, 558 mm TL, male), showing difference of body coloration.

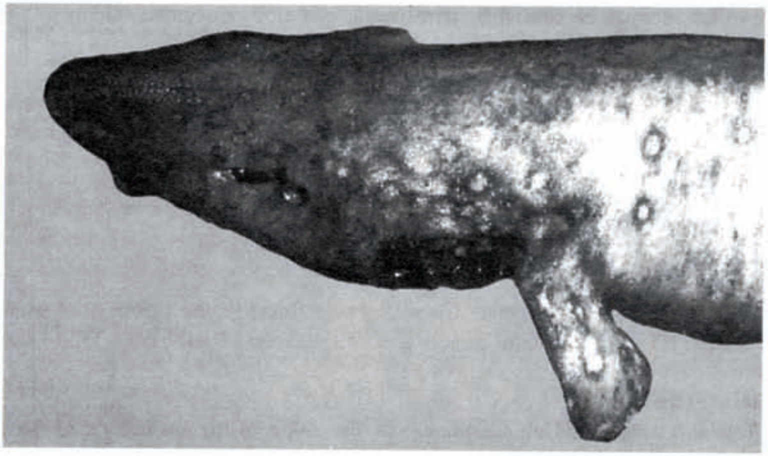

Fig. 5. - *Apristurus albisoma* n. sp. (paratype MNHN 1997-3383, male, 547 mm TL) with ocellus-like blotches. (Photo P. Laboute).

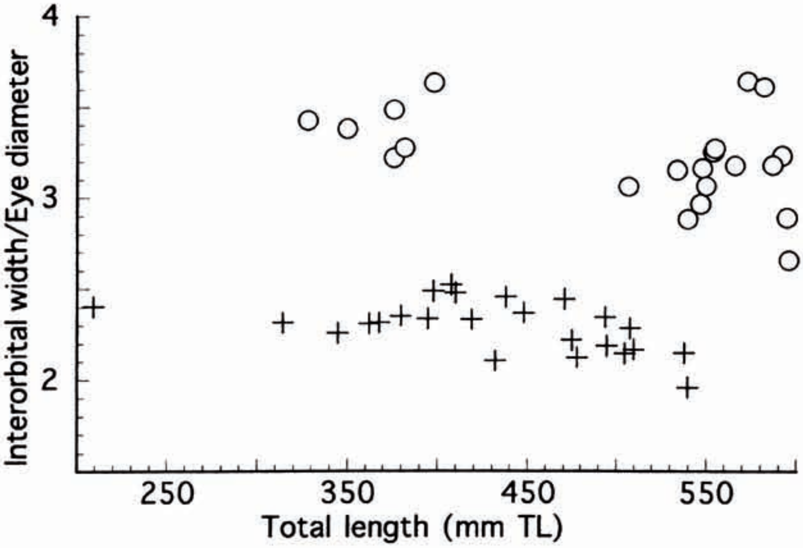

Fig. 6. - Relation of interorbital width and eye diameter in *Apristurus albisoma* n. sp. (○) and *A. aphyodes* (+).

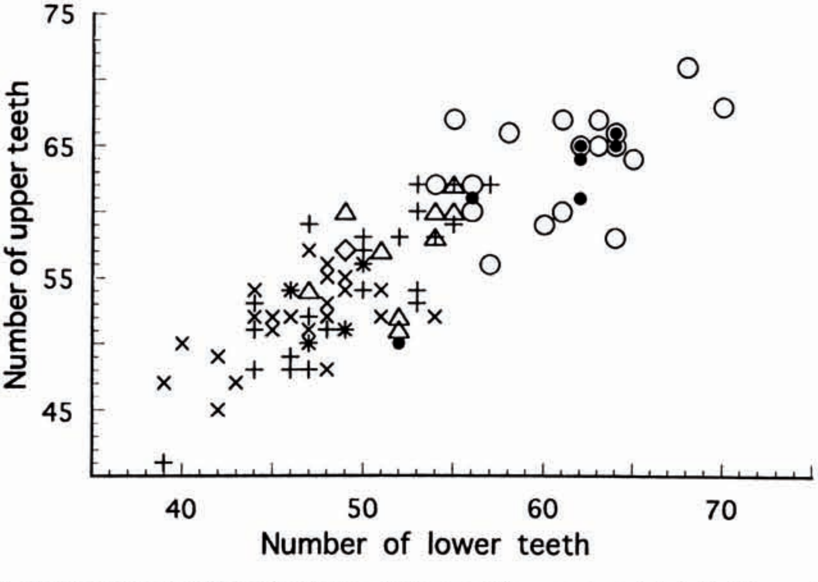

Fig. 7. - Number of upper and lower jaw teeth in *Apristurus albisoma* n. sp. and Indo-Pacific species in the *spongiceps* group. ○: *A. albisoma* n. sp.; ×: *A. fedorovi*; +: *A. kampae*; ●: *A. pinguis*; ◊: *A. spongiceps*; Δ: *A. stenseni*.

Although body coloration is enough to identify *A. albisoma* in the Indo-Pacific region, we further discuss other distinguishing characters within the Indo-Pacific species, i.e., *A. fedorovi* and *A. pinguis* from the western Pacific, *A. kampae* and *A. stenseni* from

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